

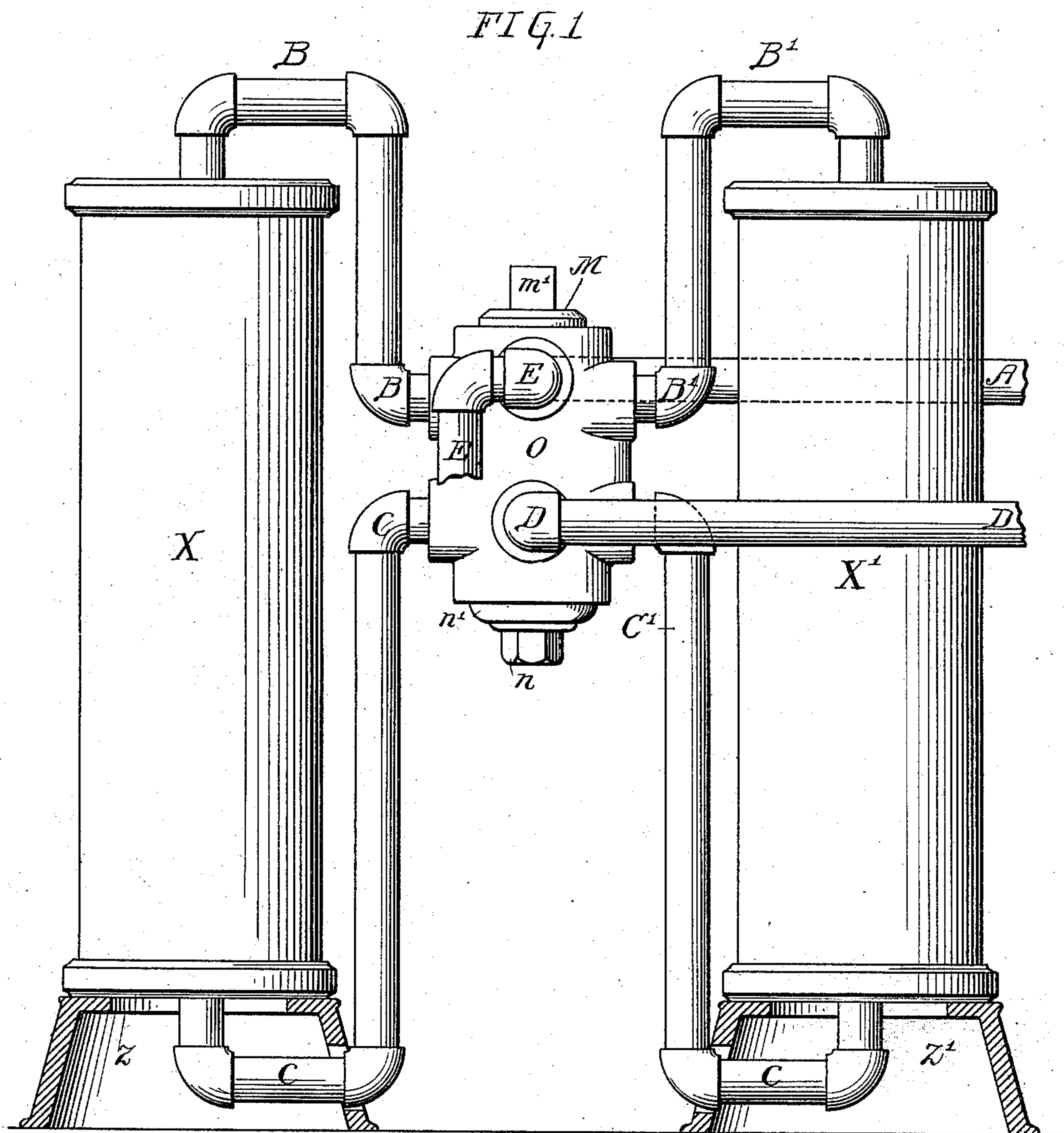
(No Model.)

4 Sheets—Sheet 1.

D. W. FIELD.  
VALVE.

No. 535,366.

Patented Mar. 12, 1895.



Witnesses:  
Jno. E. Santos  
J. Henderson.

Inventor:  
David W. Field,  
by his Attorney,  
H. M. Pettie.

(No Model.)

4 Sheets—Sheet 2.

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FIG. 17

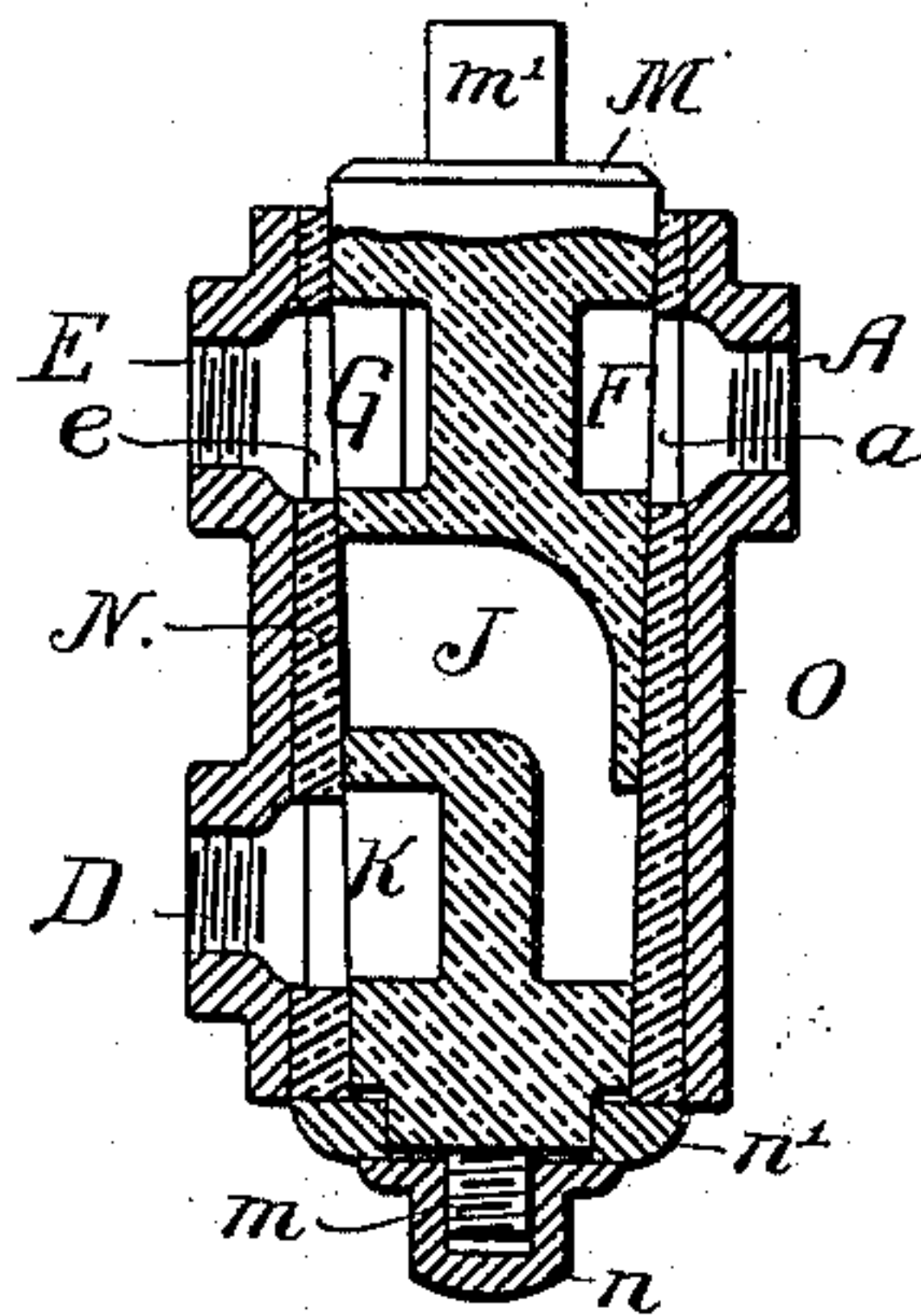


FIG. 2

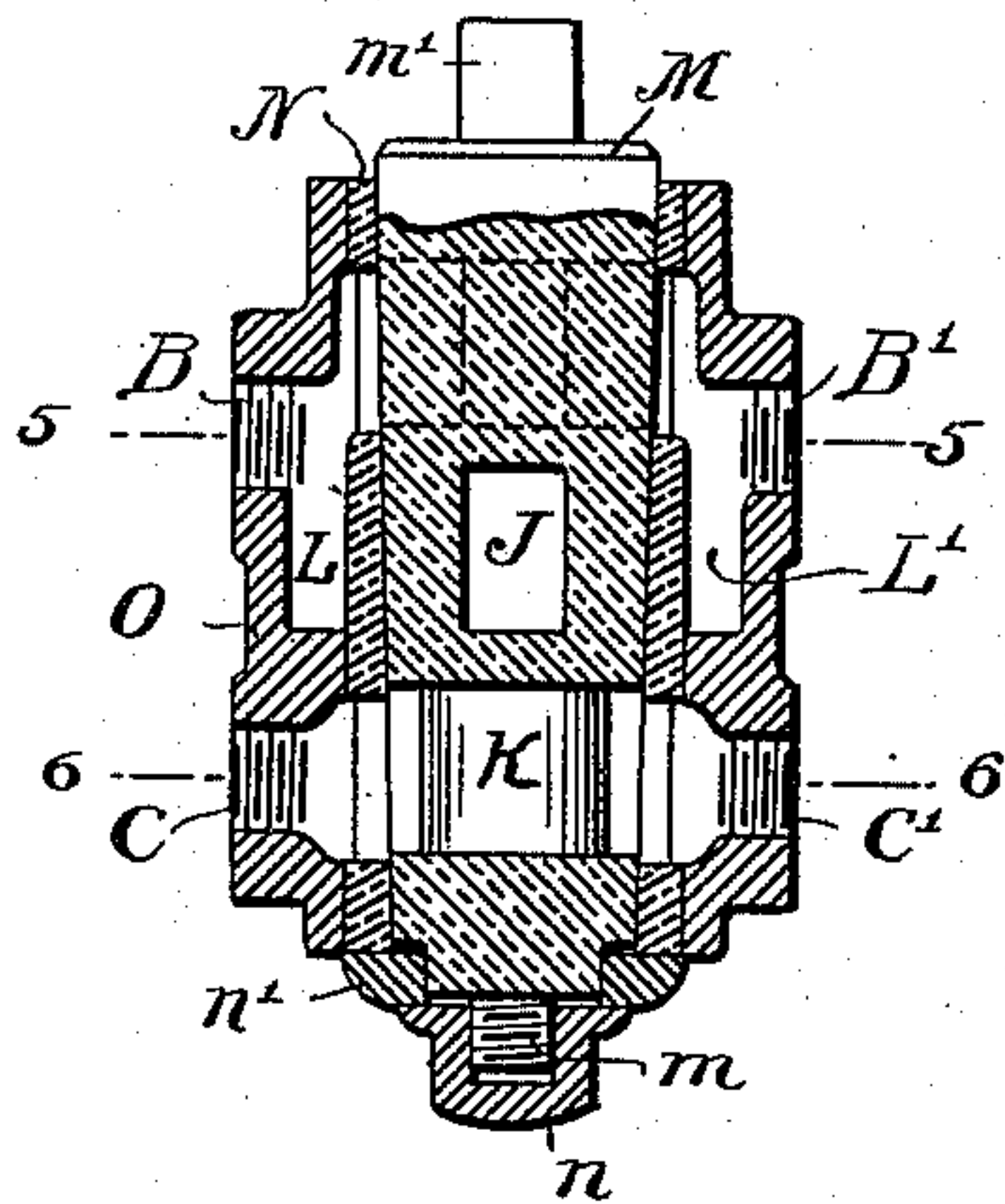
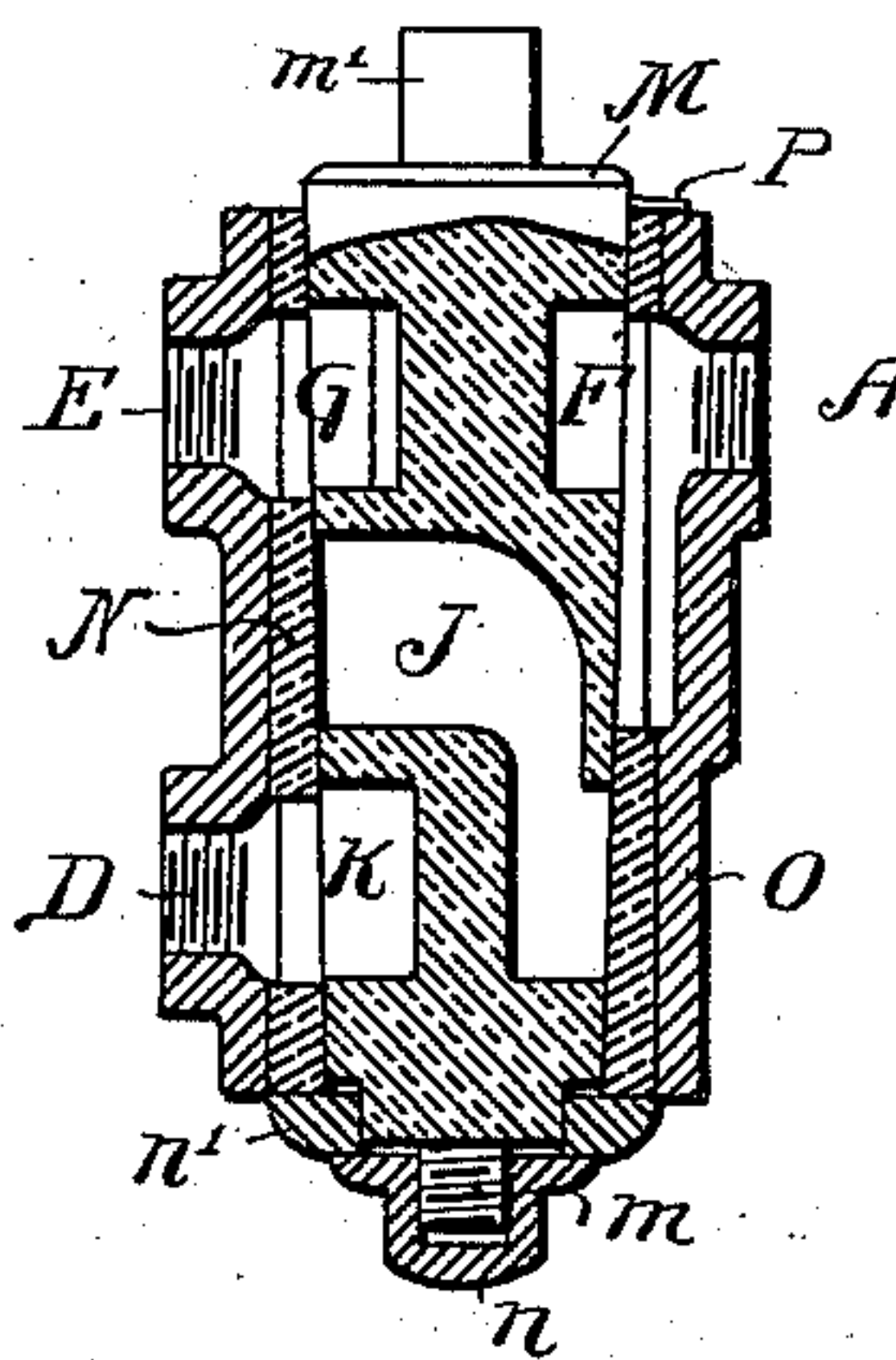


FIG. 3



Witnesses:  
J. E. Parker  
J. Henderson.

Inventor:  
David W. Field,  
by his Attorney,  
I. M. Felt.

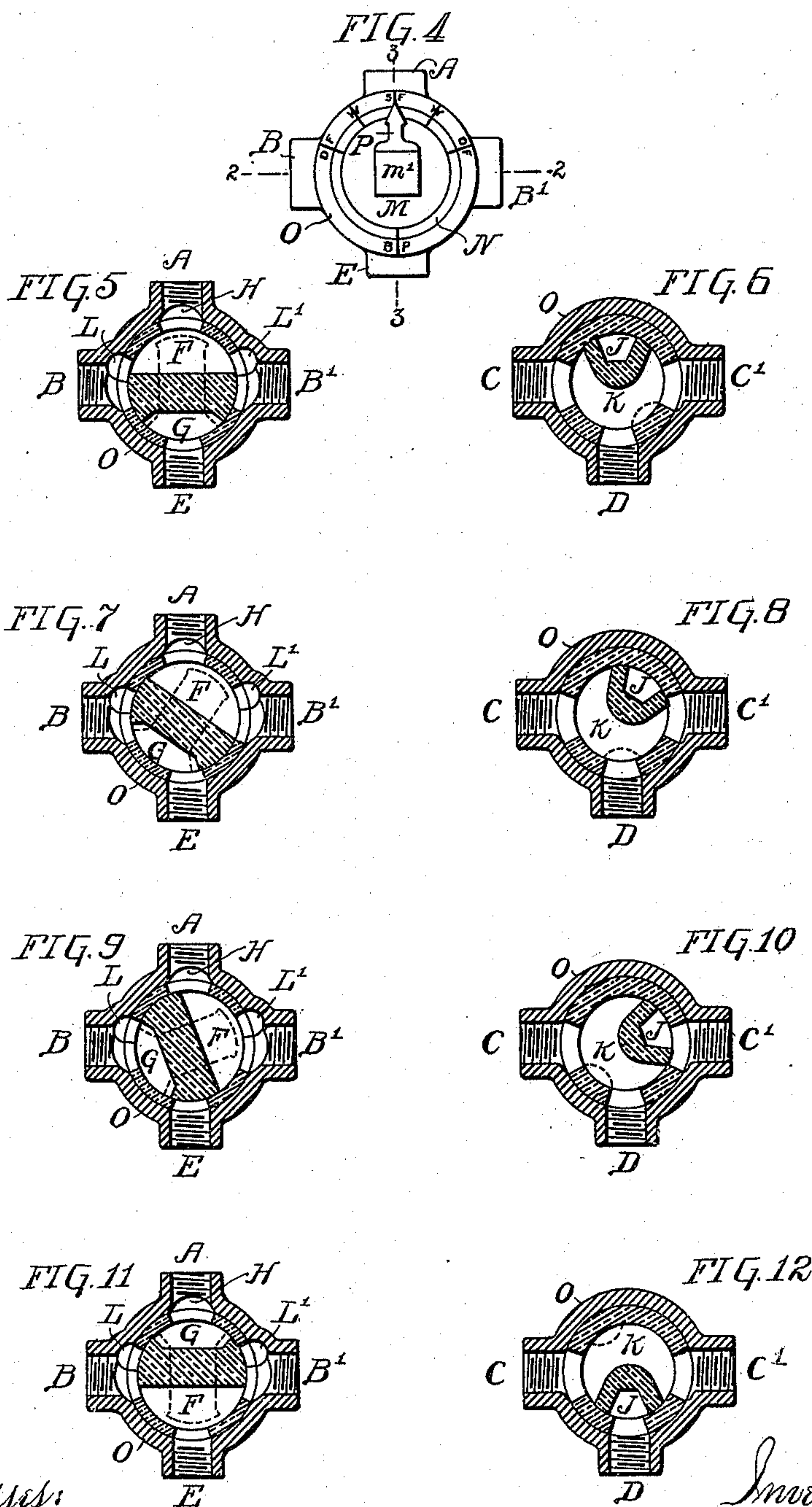
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Witnesses:  
*Jno E. Parker*  
*J. Henderson*

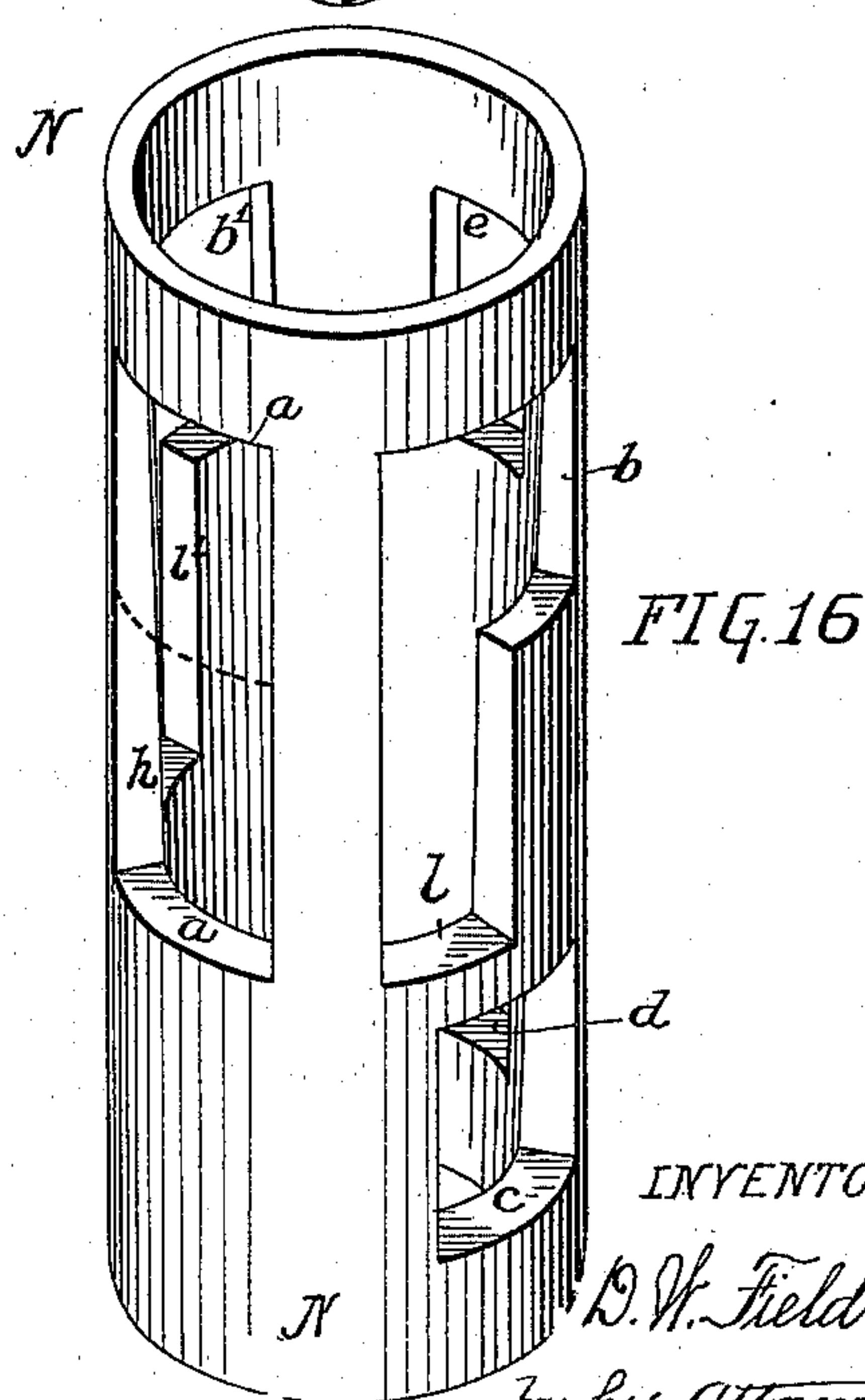
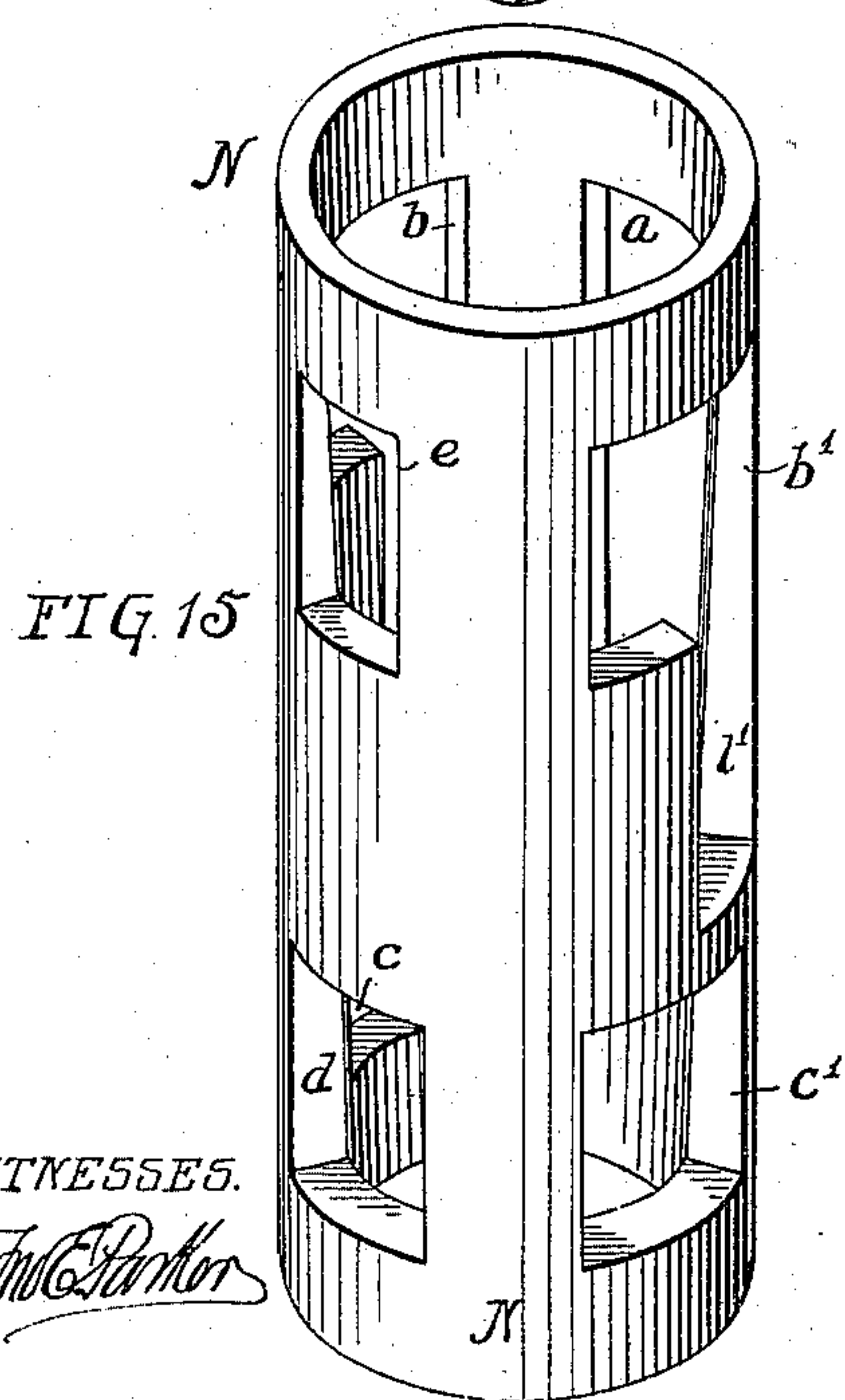
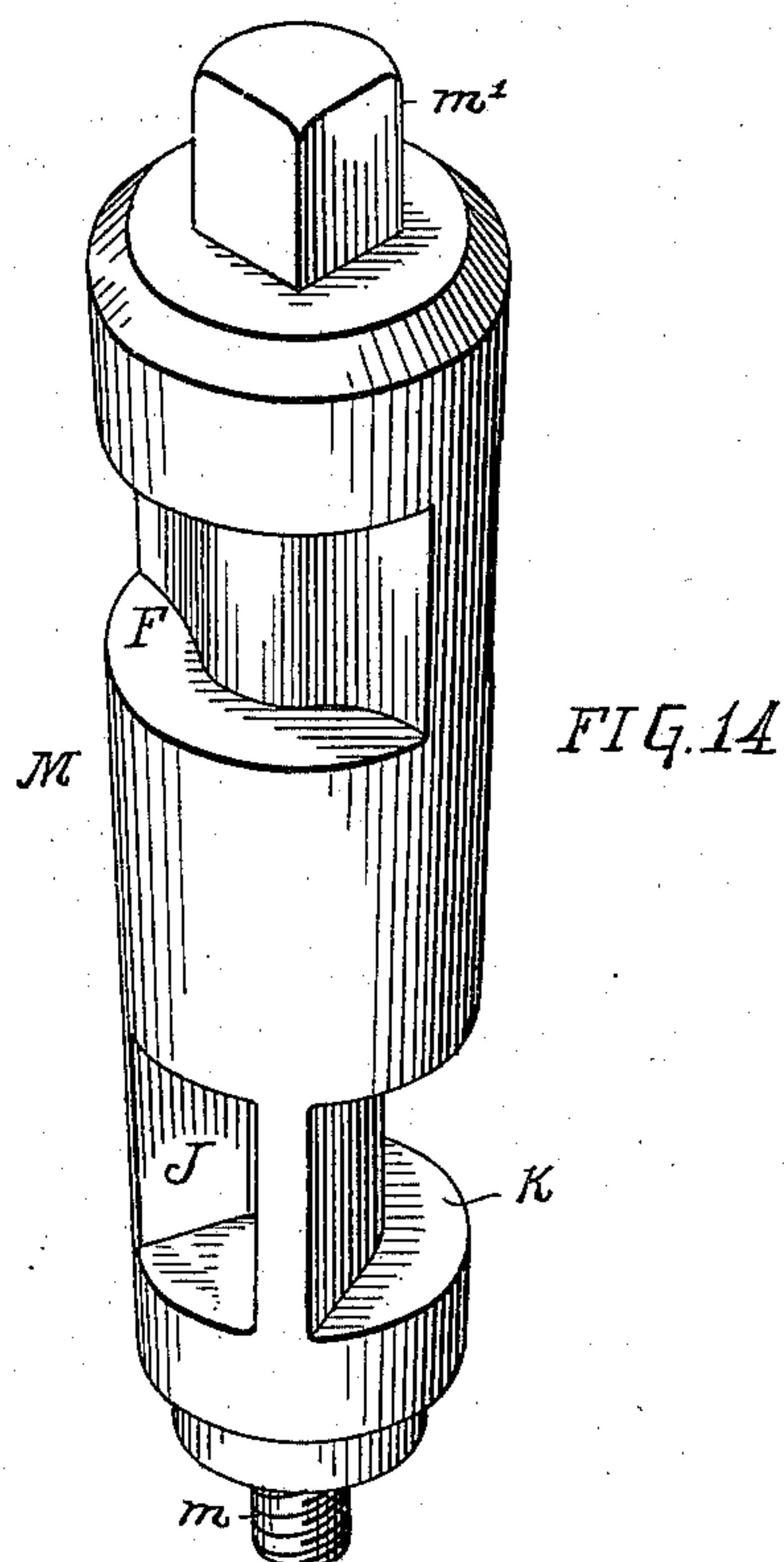
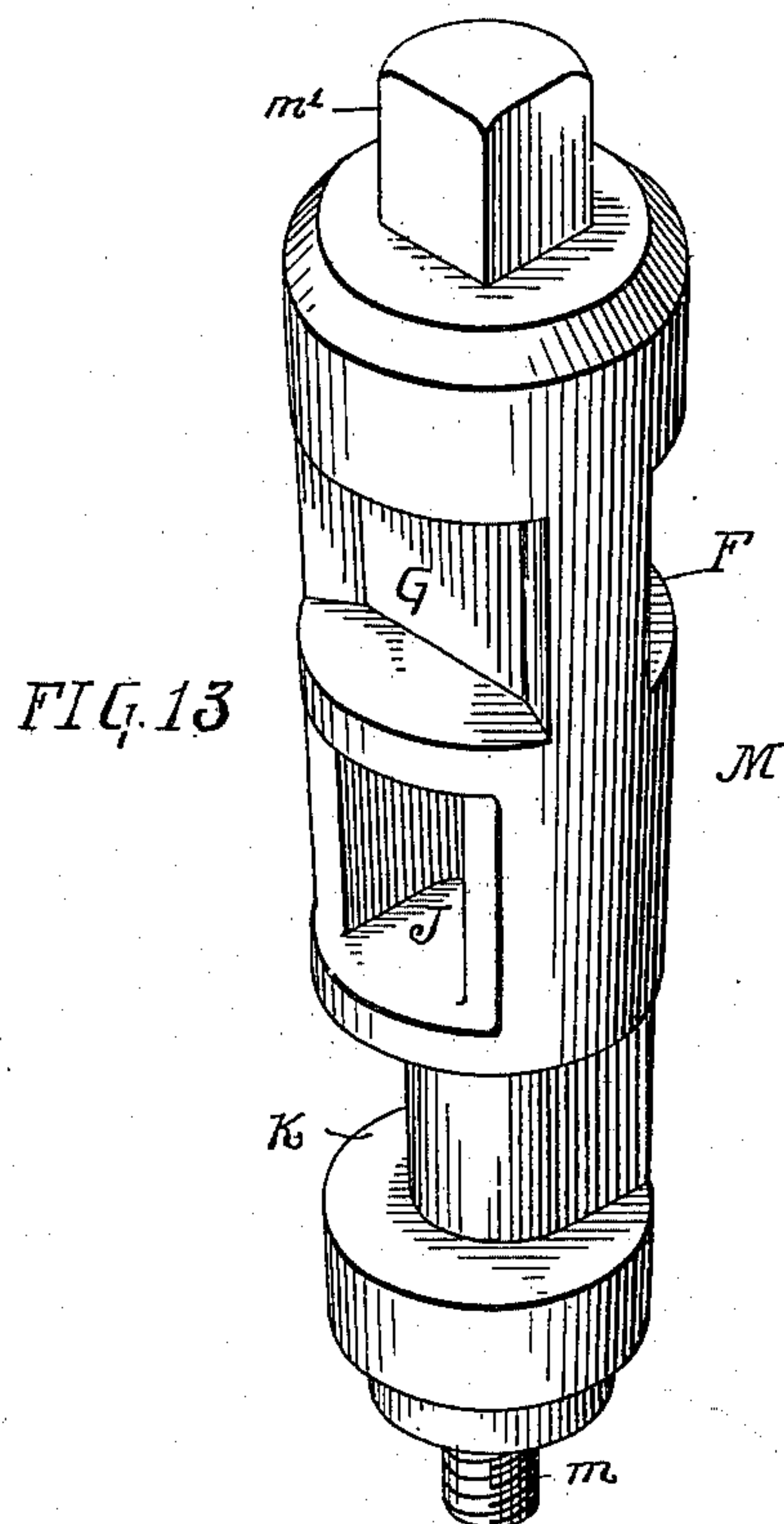
Inventor:  
*David W. Field*  
by his Attorney,  
*1 Stone & Pettit*



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VALVE.

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WITNESSES.

*John C. Parker*

*Fred. A. Fleischmann*

INVENTOR

*D. W. Field*

*by his Attorney,*

*James Peter*



# UNITED STATES PATENT OFFICE.

DAVID W. FIELD, OF PHILADELPHIA, PENNSYLVANIA.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 535,366, dated March 12, 1895.

Application filed May 7, 1894. Serial No. 510,336. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID W. FIELD, a citizen of the United States, and a resident of the city of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 The object of my invention is to so construct a valve that a fluid supply either of liquid or gas may be directed through a number of passages leading from the valve chamber and the direction of flow be changed at  
15 will to either cut off the flow entirely or to direct it through one or more exit pipes, as more fully set forth hereinafter.

The valve forming the subject of my present invention is designed more especially for  
20 use in connection with liquid filters in which more than one filtering chamber is employed, and it is so constructed that the flow of liquid to be filtered may be directed through one or more of the filtering chambers, or it may be  
25 so turned as to direct the passage of the water to cleanse one of the chambers while filtering through the other chamber, the flow being constantly under control and being directed by the turning of the valve plug in any  
30 desired direction and through any of the inlet or exit pipes leading to or from the filtering chamber, all of such pipes being connected at different points to the casing of the valve.

In the accompanying drawings,—Figure 1  
35 is an elevation of a valve constructed in accordance with my invention and showing it in use in connection with a pair of filtering chambers. Fig. 2 is a vertical section of the same on the line 2—2, Fig. 4. Fig. 3 is a vertical section on the line 3—3, Fig. 4. Fig. 4  
40 is a plan view. Fig. 5 is a sectional plan view on the line 5—5, Fig. 2. Fig. 6 is a sectional plan view on the line 6—6, Fig. 2. Figs. 7, 8, 9, 10, 11 and 12 are sectional plan  
45 views corresponding to Figs. 5 and 6, and illustrating the valve plug in different positions. Fig. 13 is a perspective view of one face of the valve plug on an enlarged scale. Fig. 14 is a similar view of the opposite face  
50 of the plug. Figs. 15 and 16 are respectively, perspective views from the front and rear of the valve bushing, and Fig. 17 is a sectional

elevation illustrating a modified construction of bushing and valve casing.

Referring to the drawings, O, represents a  
55 suitable valve chamber or casing to which are connected all of the pipes through which it is desired to control the flow of fluid.

A, designates the supply pipe which leads directly to an opening or port in the upper  
60 portion of the valve body and at a point diametrically opposite there is connected to the casing a pipe, E, through which the waste fluid escapes, when the device is used in connection with a filtering system. To the upper  
65 portion of the valve body, O, are also connected diametrically opposed pipes B, B', which, in the present instance, lead to the upper end of the filtering chambers, X, X', respectively.  
70

In the lower half of the valve body there  
are provided but three openings, or ports, for the reception of the remaining pipes in the system, C, C', being the pipes leading from the lower end of the filtering chamber to the  
75 lower portion of the valve casing for conducting the water to a point within the casing after the completion of the filtering operation as in single filtration, and D represents a pipe also extending from the lower portion of the valve  
80 casing through which the filtered liquid is finally discharged.

The valve chamber, O, is cylindrical, having open upper and lower ends, and around the upper portion of the chamber is formed  
85 a series of equi-distant openings forming ports, A, B, B', and E, from which extend the fluid conducting pipes, the pipe leading to the port, A, being that through which the fluid is supplied to the valve. Around the lower  
90 portion of the valve chamber are arranged three openings, forming ports, C, C', and D from which extend fluid conducting pipes; the ports, C, C' and D being preferably in the same vertical plane with the ports, B, B' and  
95 E respectively. On the interior of the valve chamber are arranged vertical passages L, and L', which extend to the ports, B, B', respectively and in some instances, as illustrated, in Fig. 3, I prefer to form a third chan-  
100 nel or passage H, which communicates with the inlet port, A.

Within the valve chamber is arranged a bushing, N, the internal diameter of which



gradually increases toward its upper end, and the position of which is fixed. In this bushing are formed a number of openings, or ports, those of the lower series, *c*, *c'* and *d*, 5 being simple openings arranged directly opposite the chamber ports, *C*, *C'*, and *D* respectively, while those of the upper series are somewhat larger and are disposed with reference to the upper series of chamber ports and the 10 vertical passages communicating therewith. This upper series of ports comprises an opening, *e*, in line with the port, *E*, and openings *a*, *b*, and *b'*, in line with the ports, *A*, *B*, and *B'* respectively. The openings *b*, *b'* are, how- 15 ever, extended downwardly to form supplemental openings *l*, *l'*, in line with the passages, *L*, and *L'*, respectively of the valve chamber, while the port, *a*, is, in some instances, no larger than the inner opening of 20 the port, *A*, as illustrated, for instance, in Fig. 17, and by the dotted lines in Fig. 16, but generally I prefer, for ordinary uses, to form this opening as shown in Figs. 3 and 16, in which it is illustrated as extended down in line with 25 the passage, *H*, of the valve chamber. These openings in the bushing may, of course, be formed in the valve casing proper, and the bushing, as a separate piece, be omitted.

Fitted within the bushing, *N*, is a plug, *M*, 30 the exterior of which is tapered to snugly fit within the tapered interior diameter of the bushing, and in order to prevent their leakage there is formed at the lower end of the plug a threaded spindle *m*, to which is adapted 35 a flanged nut, *n*, which bears upon a washer, *m'*, fitting against the lower end of the bushing, *N*, so that by tightening the nut the plug may be drawn down within the tapered opening in the bushing and all leakage prevented, 40 as from time to time adjustment may become necessary through frictional wearing away of the surfaces of the plug and bushing.

The upper end of the plug is provided with a squared projection *m'*, to which a key, or 45 wrench, may be attached for turning the plug to any desired position, and in order to insure the proper amount and direction of movement of the plug for directing the flow of fluid through any of the desired ports, I secure to 50 the plug a pointer or indicator, *P*, adapted to travel over a graduated scale formed on the upper surface of the valve chamber and suitably marked so that the operator may determine to just what extent it will be necessary 55 to turn the plug to control the flow of the fluid in a desired direction. In the upper portion of the plug and in line with the upper series of chamber ports are formed two ports *F* and *G*, disposed on opposite sides of the 60 plug, the port, *F*, being somewhat larger than the port, *G*, owing to the relative position of the ports. In the lower portion of the plug is formed, in line with the lower series of chamber ports, a port, *J*, which extends vertically 65 through the plug and terminates on the opposite side of the same in line with the channels, or passages, *H*, *L*, and *L'*, and their corre-

sponding openings in the bushing, *N*. The walls forming this port, *J*, are comparatively thin and the remainder of the lower portion 70 of the plug, in line with the lower series of ports, is removed to form a large port, *K*.

The valve which forms the subject of my present invention, being more particularly adapted for use in connection with a filtering 75 device, is illustrated in Fig. 1 as being used as a controlling device for two filtering chambers, *X*, *X'*, and from the various ports in the valve chamber lead pipes, *A*, for the main supply; *B*, *B'*, for the branch supplies to the 80 filtering chamber; *C*, *C'* for conducting the filtered water from the filtering chambers to the valve chamber, from whence it is conducted through pipe, *D*, to the point where it is to be used; and *E* a pipe leading from 85 the valve chamber for the passage of waste water when one or other, or both, of the filters are being washed or cleansed by the passage of water through them in a direction op- 90 posite from that in which it passes in being filtered. The uses of the valve, however, are many and varied and it is described in this connection merely as a matter of illustration.

In operation, if it is desired to divide the fluid entering through the pipe, *A*, into two 95 streams which pass through pipes, *B*, *B'*, to the filtering chambers and after being filtered escape through the pipes, *C*, *C'*, to the valve chamber and from thence through the discharge pipe, *D*, the plug is turned until the 100 pointer, *P*, is opposite the mark, *S. F.* (single filtration) Fig. 4, when the plug will assume the position indicated in Figs. 5 and 6; Fig. 5 representing the upper portion of the valve, and Fig. 6 the lower portion of the same. The 105 fluid entering at *A* is received in the port, *F*, and can only escape through the ports, *B*, *B'*, which conduct it to the filters. After the filtering operation the fluid enters the valve chamber through the pipes, *C*, *C'*; is received in the 110 port, *K*, and can only escape through the discharge pipe, *D*. This is the operation when single filtration, or a filtration of the water once only, through the filtering chambers is desired. To effect the washing of one of the chambers 115 with water filtered through the opposite chamber, the plug is turned until the pointer is opposite the mark, *W*, Fig. 4, on either the right or left hand side according to which of the chambers is to be washed, the movement 120 of the pointer to the right hand side causing the plug to assume the position illustrated in Figs. 7 and 8 and effecting the cleansing of the left filtering chamber, *X*. The fluid enters at *A*; passes through port *F*, to pipe, *B'*; 125 from thence through the filtering chamber, *X'*, up through pipe, *C'*, to port *K*; through pipe, *C*, to lower end of filter, *X*; from thence escaping from the upper end of the filter through pipe, *B*, to port, *G*, and out through 130 the waste pipe, *E*. It will be noted that in passing through the port, *K*, some of the filtered water will pass through the discharge pipe, *D*, so that the supply of filtered water



will not be entirely cut off during the cleansing operation. The movement of the pointer, P, to the mark, W, on the left hand side of the valve chamber will, of course, effect a distribution of the fluid in directions directly the opposite of that above described and the washing of the right filtering chamber, X', will be effected.

To pass the fluid through the filters, consecutively, and thus effect a double filtration of the fluid, the plug, M, is so turned, either to the right or left, that the pointer shall come opposite to the mark D. F. (double filtration) when, if turned to the right, the plug will assume the position shown in Figs. 9 and 10. The fluid in this case enters at A, passes through port, F, out through pipe, B', to filtering chamber, X', thence through pipe, C', through the port or by-pass, J, to the vertical channel or passage, L, out through the port, B, from thence to the filtering chamber, X, and from pipe, C, to port, K, and escape through the discharge port, D.

If it be desired to permit the fluid to pass directly from the supply, A, to the discharge, D, the plug is turned until the pointer, P, is opposite the mark B. P. (by-pass) when the plug will assume the position shown in Figs. 11 and 12, so that the fluid entering at A will pass through the channel, H, and the by-pass, J, and out through the discharge pipe, D.

In the modified structure shown in Fig. 17, and by dotted lines in Fig. 16, this channel,

H, is entirely omitted from the valve casing and the opening, h, in the bushing is smaller, so that when the plug is turned to the position shown in Figs. 11 and 12 the flow of fluid is entirely cut off and can go no farther than to the port, G.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination of two or more filtering chambers, a supply pipe for conducting the fluid to be filtered, a series of branch pipes for conducting the fluid from the supply pipe to the filters; a second series of branch pipes for conducting the filtered fluid away from the filters, a discharge pipe through which said filtered fluid is conducted, a waste pipe for conducting the washing water away from the filters, a valve chamber to which all of said pipes are separately connected and a ported plug adapted to said valve chamber, said plug being provided with ports for so distributing the fluid from the supply pipe that it may be conducted to one, or other, or both of the filters and conveyed away from said filter through the discharge pipe, or waste pipe, substantially as specified.

In witness whereof I have hereunto set my hand this 3d day of May, A. D. 1894.

DAVID W. FIELD.

Witnesses:

JNO. A. MCCARTHY,  
HORACE PETTIT.